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# मानक

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IS 5011 (1968): Gooch crucibles [CHD 10: Glassware]



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“Knowledge is such a treasure which cannot be stolen”



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**IS : 5011 - 1968**  
**( Reaffirmed 1976 )**

*Indian Standard*  
**SPECIFICATION FOR**  
**GOOCH CRUCIBLES**

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**INDIAN STANDARDS INSTITUTION**  
**MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG**  
**NEW DELHI 110002**

# Indian Standard

## SPECIFICATION FOR GOOCH CRUCIBLES

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# *Indian Standard*

## SPECIFICATION FOR GOOCH CRUCIBLES

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 22 November 1968, after the draft finalized by the Ceramicware Sectional Committee had been approved by the Chemical Division Council.

**0.2** Use of a filter-mat of purified asbestos supported on the perforated base of a tall platinum crucible was first made by F.A. Gooch (1878). Subsequently similar filtering devices were used first with porcelain crucibles, and later with silica crucibles. However, the porcelain crucible with perforated base is now termed as Gooch crucible and widely used in chemical analysis. Since the asbestos normally used for Gooch crucibles tends to lose weight above 283°C, it is recommended that precipitates requiring heating above 280°C should not be collected in such crucibles.

**0.3** This standard contains clauses 3.8 and 5.1 which provide for agreement between the purchaser and the supplier.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard prescribes the requirements and the methods of sampling and test for porcelain Gooch crucibles used for analytical purposes.

**1.1.1** This standard covers only porcelain Gooch crucibles.

**1.2** Glass and platinum Gooch crucibles are not covered.

### 2. TERMINOLOGY

**2.1** For the purpose of this standard, the definitions given in IS : 2781-1964† shall apply.

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\*Rules for rounding off numerical values (revised).

†Glossary of terms relating to ceramicware.

### 3. REQUIREMENTS

**3.1 Material and Manufacture** — The crucibles shall be made of porcelain of suitable chemical and thermal properties and shall be thoroughly vitrified.

**3.2 Shape** — The crucibles shall generally have the shape as shown in figure in Table 1.

**3.2.1** The lid, when used with the crucible, shall be slightly domed and the edges shall overlap the crucible, and be provided with suitable arrangement for lifting by means of tongs. Suitable sizes of lid shall be chosen from IS : 2837-1964\*.

**3.3 Dimensions** — The crucibles shall conform to the dimensions given in Table 1.

**3.3.1** The tolerance shall be  $\pm 3.5$  percent on all dimensions.

**3.4 Glaze and Porosity** — The Gooch crucibles shall be glazed all over, except the bottom and the portions where they are supported for firing. The unglazed edges or points shall have a smooth finish.

**3.4.1** When tested in accordance with the method prescribed in 5 of IS : 2836-1964†, the crucibles shall not show any cracks, pin holes, crazing and peeling defects, and also any stain on the glazed surface or the creepage of any stain between the glaze and the body or both.

**3.5 Thermal Shock Resistance** — The crucibles shall not crack or craze when heated to 260°C and suddenly cooled in accordance with the method prescribed in 6 of IS : 2836-1964†.

**3.6 Constancy of Weight on Ignition** — The crucibles shall not vary in weight by more than 0.2 mg/10 g of total weight, when tested in accordance with the method prescribed in 9 of IS : 2836-1964†.

**3.7 Resistance of Glaze to Acid and Alkali** — The crucibles shall not show losses in weight greater than those prescribed below when tested in accordance with the method prescribed in Appendix A:

*mg/dm<sup>2</sup> of the Total Inner Surface  
of the Crucible*

Hydrochloric acid	1
Sodium carbonate	5
Sodium hydroxide	30

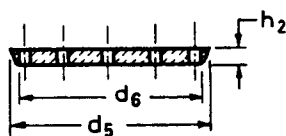
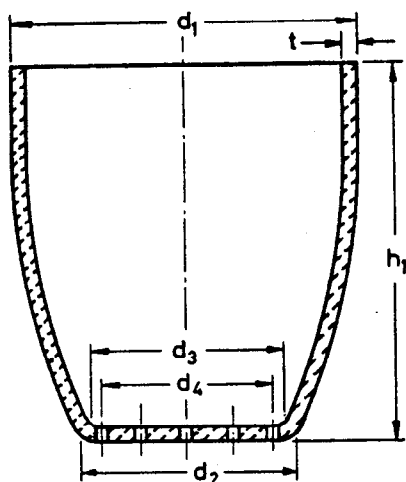
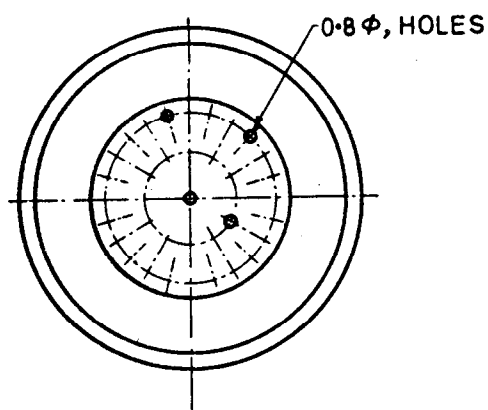
**3.8 Filter Base (Optional)** — When agreed to between the purchaser and the supplier, the crucibles shall be supplied with corresponding filter bases (see figure in Table 1). The dimensions of the filter bases shall be as given in Table 2 read with figure in Table 1.

\*Specification for porcelain crucibles and basins.

†Methods of test for laboratory porcelain.

TABLE 1 DIMENSIONS OF GOOCH CRUCIBLES

( Clause 3.3 )



FILTER PLATE

SL No.	DESIGNATION	NOMINAL BRIMFUL CAPACITY	CRUCIBLE					WALL THICKNESS $t$
			$d_1$	$d_2$	$d_3$	$d_4$	$h_1$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ml	mm	mm	mm	mm	mm	mm
i)	25	8	25	16	14	11	28	1.5
ii)	30	15	30	20	18	15	35	1.5
iii)	40	35	40	25	22	20	43	1.75



TABLE 2 DIMENSIONS OF FILTER BASES

( Clause 3.8 )

Sl No.	DESIGNATION	FILTER BASE		
		$d_1$	$d_2$	$h_2$
(1)	(2)	(3)	(4)	(5)
		mm	mm	mm
i)	25	15	13	1.8
ii)	30	19	17	2
iii)	40	24	22	2.2

#### 4. MARKING

4.1 The crucibles shall be indelibly marked under the glaze with the following:

- a) Trade-mark of the manufacturer, if any; and
- b) Designation.

4.1.1 The crucible may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

#### 5. PACKING

5.1 The crucibles shall be suitably packed in wooden cases or cardboard boxes as agreed to between the purchaser and the supplier.

#### 6. SAMPLING

6.1 The method for drawing representative samples of Gooch crucibles and the criteria for conformity shall be as prescribed in Appendix B.

### APPENDIX A

( Clause 3.7 )

#### DETERMINATION OF RESISTANCE OF GLAZE TO ACID AND ALKALI

##### A-0. OUTLINE OF THE METHOD

A-0.1 Test pieces are broken from crucibles and are digested with standard solutions of acid and of alkali and their loss in weight is determined.

## A-1. REAGENTS

**A-1.1 Dilute Hydrochloric Acid** — Dilute 600 ml of hydrochloric acid ( density 1.16 g/ml ) conforming to IS : 265-1962\* to 1 litre in a measuring flask with distilled water conforming to IS : 1070-1960†.

**A-1.2 Sodium Carbonate Solution** — Dissolve in distilled water ( IS : 1070-1960† ) pure sodium carbonate conforming to IS : 296-1965‡, equivalent to 50 g of the anhydrous salt and dilute to 1 litre in a measuring flask.

**A-1.3 Sodium Hydroxide Solution** — Dissolve 50 g of sodium hydroxide conforming to IS : 376-1952§ in distilled water and dilute to 1 litre in a measuring flask.

## A-2. PREPARATION OF TEST PIECES

**A-2.1** Break two test pieces from unused crucibles so that the total area of two glazed sides is about 25 cm<sup>2</sup>. Wash the test pieces in cold, dilute hydrochloric acid, followed by distilled water, dry in an air oven at 120° ± 2°C and weigh after cooling at room temperature.

## A-3. PROCEDURE

**A-3.1** Place the two test pieces in a small glass beaker and cover them with hydrochloric acid. About 50 ml shall be required. Cover the beaker with a clock-glass and heat on a steam-bath for 4 hours. Take the test pieces out and wash thoroughly with distilled water and dry to constant weight at 120° ± 2°C. Weigh after cooling.

**A-3.2** Test as in A-3.1 above but using two fresh test pieces prepared as in A-2.1 and sodium carbonate solution. After the heating, wash the test pieces with cold, dilute hydrochloric acid, followed by distilled water and then dry at 120° ± 2°C. Weigh the two test pieces after cooling.

**A-3.3** Test as in A-3.1 above but using two fresh test pieces prepared as in A-2.1 and sodium hydroxide solution. Wash the test pieces with cold, dilute hydrochloric acid, followed by distilled water and then dry at 120° ± 2°C. Weigh the two test pieces after cooling.

NOTE — In tests A-3.2 and A-3.3 the volume of the solution shall be made up from time to time, if necessary, by adding hot distilled water.

**A-3.4 Report** — Report the average loss in milligrams per square decimetre of the inner surface of the crucibles for each of the tests in A-3.1, A-3.2 and A-3.3 separately.

\*Specification for hydrochloric acid ( revised ).

†Specification for water, distilled quality ( revised ).

‡Specification for sodium carbonate, anhydrous ( revised ).

§Specification for sodium hydroxide, analytical reagent. ( Since revised ).

# APPENDIX B

( Clause 6.1 )

## SAMPLING OF GOOCH CRUCIBLES

### B-1. SCALE OF SAMPLING

**B-1.1 Lot** — All the Gooch crucibles of the same nominal brimful capacity, produced under essentially similar conditions of manufacture and offered for inspection at the same time, shall be grouped together to constitute a lot.

**B-1.2** The conformity of the lot to the requirements of this specification shall be ascertained separately for each individual lot. For this purpose, samples shall be taken in accordance with col 1 and 2 of Table 3.

**TABLE 3 NUMBER OF SAMPLES FOR TESTING**

NO. OF ARTICLES IN THE LOT $N$	NO. OF ARTICLES IN THE SAMPLE $n$	PERMISSIBLE NO. OF DEFEC- TIVES IN SHAPE AND DIMENSIONS	NO. OF ARTI- CLES TO BE TESTED FOR EACH OF 3.4, 3.5 AND 3.6	NO. OF ARTI- CLES TO BE TESTED FOR 3.7
(1)	(2)	(3)	(4)	(5)
Up to 50	8	0	1	3
51 „ 100	13	1	2	3
101 „ 500	20	2	3	3
501 „ 3 000	32	3	5	6
Over 3 000	50	5	8	6

**B-1.3** The samples shall be selected at random from the lot. To ensure randomness of selection, use shall be made of random number tables. In case such a table is not available, the following procedure shall be used:

Starting from any article in the lot count them as 1, 2, .....; etc up to  $r$  and so on, where  $r$  is the integral part of  $N/n$  ( see col 1 and 2 of Table 3 ). Every  $r$ th article thus counted shall be withdrawn to constitute the sample.

### B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

**B-2.1** Each of the articles in the sample as selected in B-1.3 shall be inspected for requirements 3.1 to 3.3. An article failing to meet any of these requirements shall be a defective article. The number of defective articles in the sample shall not exceed the permissible number of defectives given in col 3 of Table 3, otherwise the lot shall be considered as not conforming to the requirements.

**B-2.2** Tests for each of the requirements in 3.4, 3.5 and 3.6 shall be conducted on a number of articles as given in col 4 of Table 3 which shall be selected at random from the sample obtained in B-1.3. A fresh set of articles shall be used for each test. The lot shall be considered as conforming to these requirements if none of the articles fails in any of the tests.

**B-2.3** The tests for the requirements in 3.7 shall be conducted on a number of articles as indicated in col 5 of Table 3. These articles shall be selected at random from the sample as obtained in B-1.3. These articles shall be equally divided for testing resistance of glaze to the following (see 3.7):

- a) Hydrochloric acid,
- b) Sodium carbonate, and
- c) Sodium hydroxide.

The lot shall be considered as conforming to these requirements if none of the articles fails in any of these tests.

(Continued from page 1)

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